



Shunkai Li

Peking University

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Education

Peking University

September 2018-June 2021

Incoming student for a Master's degree of Computer Science

Beijing, China

Research areas: 3D computer vision, SLAM, machine learning

Institution: Department of Machine Intelligence, School of Electronic Engineering and Computer Science

Advisor: Professor [Hongbin Zha](#)

Nankai University

September 2014-June 2018

Major: Opto-electronic Information Science and Engineering Bachelor

Tianjin, China

Cumulated Grade Point Average: 90.94/100 Ranking: 1/33

Scientific Contests and Research Experiences

National Undergraduate Training Program for Innovation

October 2015-March 2018

Team Leader

- Research Project: Super-resolution imaging with Fourier ptychography
- Major Achievements:
 - Established the imaging system and the resolution was enhanced effectively.
 - Achieved three proposed methods in simulation based on published papers.
 - Proposed an accelerating method termed Predictive Searching Algorithm to reduce data requirement to 65%-90%, written the paper as the first author and published on the Journal of Optics (SCI).

International Mathematical and Interdisciplinary Contest In Modeling

February 2016

Team Leader

- Project: Optimization of regional water resources allocation.
- Major Achievements:
 - Employed interdisciplinary thinking and proposed the concept of *Equivalent Water*, which was treated as currency to solve the resource allocation problem.
 - Proposed the concept of *Cellular Demand* and *Package Trading* to avoid unnecessary details.
 - Creatively applied the PID controller in automation control theory to the problem.
 - Got the Meritorious Winner (first prize) in the contest.

Tianjin Undergraduate Physics Contest

April 2016

- Won the top prize (Top. 1) in the contest.
- Was invited to attend the Tianjin Annual Meeting of Physics and delivered a speech on behalf of undergraduates.

National Undergraduate Opto-electronic Design Contest

April-July 2016

Team Leader

- Major Achievements:
 - Our team designed the PCB and CMOS image acquisition system based on FPGA.
 - Designed the phase corrector using wave-front coding. Achieved image fusion with wavelet transform.
 - The image resolution reached the diffracting limitation level of opto-electronic system.
 - Won the third prize in the final contest.

Defect Detection of Monocrystalline Silicon With Machine Vision

September 2016-September 2017

- Major Achievements:
 - Designed the machine vision detection system, realized multi-angle acquisition and information fusion.
 - Solved the uneven illumination and vignetting problems using top-hat transformation.
 - Successfully extracted defects with 96% accuracy and classified them using Support Vector Machine and Neural Networks with the accuracy up to 88%.

Internship

CalmCar Electronic Technology Co., Ltd

September-November 2017

Computer Vision Algorithm Intern

- Project: Application of monocular SLAM in autonomous driving
- Major Achievements:
 - Achieved high precision pose estimation of the vehicle using ORB-SLAM, reduced the accumulative error of continuous 5000 frames to only 8 degrees and replaced the IMU unit consequently.
 - Calibrated the moving scale between frames of SLAM to solve the scale-drifting problem of monocular SLAM. Achieved high precision positioning by plotting the driving route without GPS.
 - Used deep learning to detect moving targets and ignored them during feature extraction, so as to obtain features in the stationary scene, which improves the accuracy of positioning and map reconstruction.
 - Optimized the SLAM algorithm, the processing speed achieved 50 fps without GPU.

Samsung Electronics Research China

November 2017-Present

SLAM Algorithm Intern

- Project: Application of monocular SLAM in mobile devices for augmented reality
- Major Achievements:
 - Achieved plane detection and fitting using sparse feature points and improves the fitting effect of virtual objects on real objects. The methods include RANSAC, semantic segmentation and CNN.
 - Created dense depth map using ORB-SLAM and CNN.
 - Combined VINS and ORB-SLAM to create a novel, light weight visual-inertial SLAM algorithm. It uses the IMU data from Samsung S8+ mobile phone to recover the scale. The proposed method has higher accuracy of tracking, localization, mapping, and improved robustness to shaking and low-textured environments.

Paper and Patent

- Paper: *Predictive searching algorithm for Fourier ptychography* the first author published
Journal of Optics, UK Impact factor: 1.85 SCI
- Patent: *An Indoor Micro Landscape Device* the first inventor No. ZL 2016 2 0832393.7

Studying Abroad

Oxford Summer Institute at Oriel College

July-August 2016

- Won the Scholarship for Overseas Studies in Nankai University. Oxford, UK
- The academic program includes lectures and seminars which were given by renowned scholars of the University of Oxford, Cambridge and Princeton, and was supplemented by curriculum designs.
- Got Top. 1 in *Image Processing and Closest Point Method* and *Symmetries in Physics* courses.
- Was awarded as the Excellent Student of Oxford Summer Institute (Top 5%).

Skills

- Experienced in image processing, computer vision, SLAM.
- Familiar with the photoelectric imaging system, proficient in engineering optics, geometric optics and physical optics.
- Proficient in English reading, writing and fluency in speaking.
- Familiar with C++, MATLAB, OpenCV, ROS, and experienced in coding under Linux.
- Experienced in team management and communication.

Awards

- Won the National Scholarship 3 times (Top 0.2%). 2015-2017
- Person of the Year of Nankai University 2016
- The Scholarship for Undergraduate Innovation in Tianjin 2015
- The Scholarship for Overseas Studies in Nankai University 2016
- The First Prize Scholarship for Outstanding Students in EIOE College, Nankai University 2015
- Meritorious Winner (first prize) for Interdisciplinary Contest In Modeling 2016
- The Top Prize (Top. 1) for the Tianjin Undergraduate Physics Contest 2016
- The Third Prize for the National Undergraduate Opto-electronic Design Contest 2016
- The First Prize for the National Undergraduate English Writing Contest (preliminary) 2016
- The First Prize (Top. 1) for the Scientific Innovation Contest of Nankai University 2015
- Top 10 of the Communist Youth League Member of Nankai University 2016
- National Outstanding Team of Undergraduate Summer Social Practice (team leader) 2015
- National Outstanding Individual of Undergraduate Summer Social Practice 2015
- National Outstanding Research Report of Undergraduate Summer Social Practice 2015